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Causes of long-term landscape evolution of “passive” margins and adjacent continental segments at the South Atlantic Ocean.

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During the last 10 years research efforts have been devoted to understand the coupling between tectonic and surface processes in the formation of recent topography. Quantification of the rate at which landforms adapt to a changing tectonic, heat flow, and climate environment in the long term has become an important research object and uses intensively data revealed by low-temperature thermochronology, terrigenous cosmogenic nuclides, and geomorphological analyses. The influence of endogenic forces such as mantle processes as one of the causes for “Dynamic Topography Evolution” have been explored in a few studies, recently. In addition, the increased understanding how change in surface topography, and change in the amount of downward moving cold surface water caused by climate change affects warping isotherms in the uppermost crust allows further interpretation of low-temperature thermochronological data.

“Passive” continental margins and adjacent continental segments especially at the South Atlantic ocean are perfect locations to quantify exhumation and uplift rates, model the long-term landscape evolution, and provide information on the influence of mantle processes on a longer time scale. This climate-continental margin-mantle process-response system is caused by the interaction between endogenic and exogenic forces that are related to the mantle-process driven rift – drift – “passive” continental margin evolution of the South Atlantic, and the climate change since the Early/Late Cretaceous climate maximum. Furthermore, the influence of major transform faults (also called: transfer zones, Fracture Zones (FZ)) on the long-term evolution of “passive” continental margins is still very much in debate.

The presentation will provide insight in possible causes for the differentiated long-term landscape evolution along the South Atlantic Ocean.